



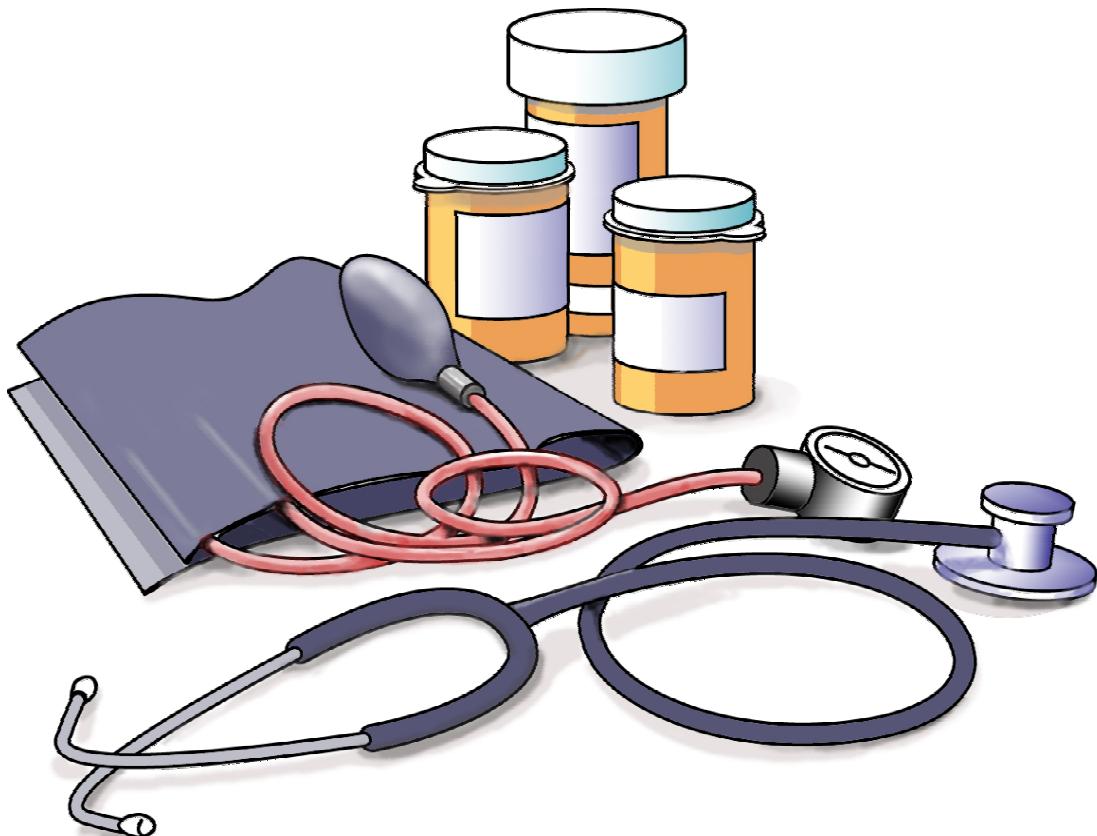
U.S. Department of  
Transportation

**Federal Railroad  
Administration**

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## Medical Standards for Railroad Workers

Office of Safety  
Washington, DC 20590



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13. ABSTRACT (Maximum 200 words) This report provides information for the FRA to use in assessing the need for a medical standards program for railroad workers performing safety-sensitive functions and in determining an appropriate course of action. The study examined existing programs of three U.S. DOT modal administrations, five foreign programs and 12 railroads representing Class 1, regional/short line and commuter operators. Review of five different sources of accident and casualty data found several accidents and injuries where the medical condition of the employee was the probable or contributing cause. Over half of employee-on-duty fatalities in 2003 were due to medical conditions. The available medical literature on operator impairment consistently links performance impairment to fatigue, certain medications and hypoglycemia. Compatibility of a medical standards program with the Americans with Disabilities Act, the Railway Labor Act, Health Insurance Portability and Accountability Act regulations and existing labor agreements does not appear to be a problem. Based on the programs of the DOT modal administrations, foreign countries and existing railroad programs, options for the various components of a medical standards program are outlined. Three alternative models for FRA involvement in such a program are presented along with resource estimates. The study concludes that the FRA should proceed with development of a medical standards program and points out key issues that must be resolved.			
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## METRIC/ENGLISH CONVERSION FACTORS

### ENGLISH TO METRIC

LENGTH (APPROXIMATE)	
1 inch (in)	= 2.5 centimeters (cm)
1 foot (ft)	= 30 centimeters (cm)
1 yard (yd)	= 0.9 meter (m)
1 mile (mi)	= 1.6 kilometers (km)

### METRIC TO ENGLISH

LENGTH (APPROXIMATE)	
1 millimeter (mm)	= 0.04 inch (in)
1 centimeter (cm)	= 0.4 inch (in)
1 meter (m)	= 3.3 feet (ft)
1 meter (m)	= 1.1 yards (yd)
1 kilometer (km)	= 0.6 mile (mi)

### AREA (APPROXIMATE)

1 square inch (sq in, in <sup>2</sup> )	= 6.5 square centimeters (cm <sup>2</sup> )
1 square foot (sq ft, ft <sup>2</sup> )	= 0.09 square meter (m <sup>2</sup> )
1 square yard (sq yd, yd <sup>2</sup> )	= 0.8 square meter (m <sup>2</sup> )
1 square mile (sq mi, mi <sup>2</sup> )	= 2.6 square kilometers (km <sup>2</sup> )
1 acre = 0.4 hectare (he)	= 4,000 square meters (m <sup>2</sup> )

### AREA (APPROXIMATE)

1 square centimeter (cm <sup>2</sup> )	= 0.16 square inch (sq in, in <sup>2</sup> )
1 square meter (m <sup>2</sup> )	= 1.2 square yards (sq yd, yd <sup>2</sup> )
1 square kilometer (km <sup>2</sup> )	= 0.4 square mile (sq mi, mi <sup>2</sup> )
10,000 square meters (m <sup>2</sup> )	= 1 hectare (ha) = 2.5 acres

### MASS - WEIGHT (APPROXIMATE)

1 ounce (oz)	= 28 grams (gm)
1 pound (lb)	= 0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb)	= 0.9 tonne (t)

### MASS - WEIGHT (APPROXIMATE)

1 gram (gm)	= 0.036 ounce (oz)
1 kilogram (kg)	= 2.2 pounds (lb)
1 tonne (t)	= 1,000 kilograms (kg)
	= 1.1 short tons

### VOLUME (APPROXIMATE)

1 teaspoon (tsp)	= 5 milliliters (ml)
1 tablespoon (tbsp)	= 15 milliliters (ml)
1 fluid ounce (fl oz)	= 30 milliliters (ml)
1 cup (c)	= 0.24 liter (l)
1 pint (pt)	= 0.47 liter (l)
1 quart (qt)	= 0.96 liter (l)
1 gallon (gal)	= 3.8 liters (l)
1 cubic foot (cu ft, ft <sup>3</sup> )	= 0.03 cubic meter (m <sup>3</sup> )
1 cubic yard (cu yd, yd <sup>3</sup> )	= 0.76 cubic meter (m <sup>3</sup> )

### VOLUME (APPROXIMATE)

1 milliliter (ml)	= 0.03 fluid ounce (fl oz)
1 liter (l)	= 2.1 pints (pt)
1 liter (l)	= 1.06 quarts (qt)
1 liter (l)	= 0.26 gallon (gal)

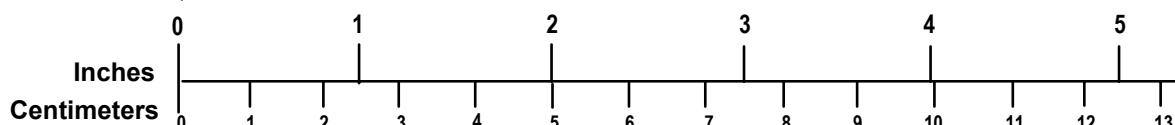
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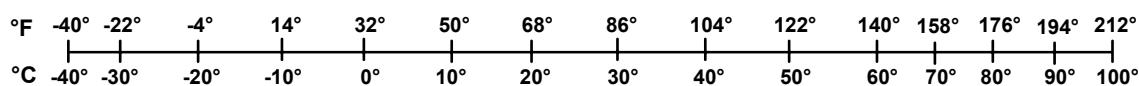
### TEMPERATURE (EXACT)

$$[(9/5)y + 32]^{\circ}\text{F} = x^{\circ}\text{C}$$

### QUICK INCH - CENTIMETER LENGTH CONVERSION



### QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSION



For more exact and or other conversion factors, see NIST Miscellaneous Publication 286, Units of Weights and Measures. Price \$2.50 SD Catalog No. C13 10286

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